

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

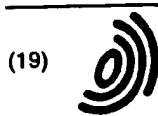
Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**



(19)

Europäisches Patentamt  
European Patent Office  
Office européen des brevets



(11)

EP 0 474 869 B1

(12)

# EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention  
of the grant of the patent:  
21.05.1997 Bulletin 1997/21

(51) Int Cl.<sup>6</sup>: C11D 7/60, C11D 7/32,  
C02F 1/56, C08G 12/32,  
C08J 11/04, C09K 3/00,  
C09D 7/00

(21) Application number: 90914958.5

(22) Date of filing: 12.10.1990

(86) International application number:  
PCT/JP90/01320

(87) International publication number:  
WO 91/12311 (22.08.1991 Gazette 1991/19)

(54) AGENT USED IN TREATING WET SPRAY BOOTH AND METHOD OF TREATMENT OF SAID  
BOOTH

MITTEL UND VERFAHREN ZUM BEHANDELN VON SPRITZKABINEN

AGENT ET PROCEDE POUR TRAITER DES CABINES DE PISTOLAGE PAR VOIE HUMIDE

(84) Designated Contracting States:  
DE FR GB SE

(30) Priority: 16.02.1990 JP 35338/90

(43) Date of publication of application:  
18.03.1992 Bulletin 1992/12

(73) Proprietor: KURITA WATER INDUSTRIES LTD.  
Shinjuku-ku Tokyo (JP)

(72) Inventors:  
• MIZUNO, Kelsuke, Kurita Water  
Shinjuku-ku, Tokyo (JP)

• HORIUCHI, Masahiro, Kurita Water  
Shinjuku-ku, Tokyo (JP)

(74) Representative: Grünecker, Kinkeldey,  
Stockmair & Schwanhäusser Anwaltssozietät  
Maximilianstrasse 58  
80538 München (DE)

(56) References cited:  
JP-A-61 108 698 JP-A-61 157 388  
JP-A-63 241 089 JP-A-63 310 695  
JP-B- 5 526 884 US-A- 3 723 148  
US-A- 3 985 922

EP 0 474 869 B1

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

## Description

## Technical Field

5 This invention relates to a wet paint spray booth treating agent and to a method for the treatment of a wet paint spray booth, and more particularly, relates to a wet paint spray booth treating agent for diminishing the tackiness of paint in a recirculating washing water to be sprayed for collecting surplus paint and preventing the paint from adhering and fastening to the interior of the system in the wet paint spray booth, and to a method for the treatment of a wet paint spray booth.

10

## Background Art

In the coating process of the automotive industry, the yield of the paint sprayed to an automobile body is generally from 60 to 80% and 40 to 20% of the used paint constitutes a surplus paint to be removed in the subsequent process. For the collection of the surplus paint sprayed excessively, treatment is usually applied in a wet spray booth by water washing and the washing water is circulated for re-use.

In the wet paint spray booth constructed as described above, since the surplus paint which is collected in the washing water has high tackiness, it adheres to the water-film panel, the piping system, the spray nozzle, etc. of the spray booth, clogs the piping system and the nozzle, and seriously degrades the efficiency of water washing. Further, when gas discharge system of the spray booth causes clogging by the deposition of the surplus paint, and the flow of air is inhibited, the solvent of the paint fills up the interior of the booth to produce a state dangerous to safety and hygiene and seriously degrades the working environment. Moreover, the greater part of the surplus paint settles to the bottom of the booth pit and the bottom of the circulation pit in the spray booth and the sedimented paint hardens into a rubbery state with elapse of time to take much time and labor for the cleaning and removal.

25 For the solution of these problems, paint spray booth treating agents to be added to the washing water have hitherto been developed, and methods of adding chemicals such as:

- (1) alkalis such as NaOH and KOH,
- (2) amphoteric metals such as Zn salts,
- 30 (3) cationic polymers, and
- (4) surface active agents

to the washing water, alone or in a combined use of two or more of them have been known. In addition, there has been proposed (5) a method of using melamine-aldehyde acid colloid (Japanese Patent Publication Sho 63-33799, corresponding to U.S.P. 4656059).

35 Among the conventional treating agents mentioned above, (1) to (4) entail the disadvantages, for example,

- (a) the effects are not sufficient,
- (b) the applicable pH ranges is narrow, stable treatment is difficult, and it requires a great amount of pH adjusting agents,
- 40 (c) the kind of paints applicable is limited and the effect is low for acrylic paints and phthalic acid type paints,
- (d) COD in the circulating water is increased due to liberation of treating agents, and
- (e) the amount of the paint sludge is increased in the case of using the metal salt, and they can not considered advantageous from an industrial point of view.

45

Further, any of (1) - (5) involves the following drawbacks when used alone.

- (f) In a case where paint load is great, sufficient reduction of tackiness may sometimes be impossible, and
- (g) effect for the reduction of tackiness is scarcely obtained for a raw paint.

The paint load means the charging rate or flow velocity of a surplus paint to be treated (over sprayed paint) and it is usually about 100 ppm based on the amount of circulating water (amount of paint/amount of circulating water) and about 200 ppm at the greatest, while different depending on the types of the paint used. Due to the introduction of manipulators and increase in the number of products in recent years, the amount of the surplus paint tends to be far increased relative to the capacity of the facility, which increases the paint load. Further, the raw paint requires treatment, for example, upon color-change (change from a certain color to another color). That is, upon color-change, since the remained paint in the piping system from the paint reservoir to the spray gun is often discarded without spraying in to the washing water, its treatment becomes necessary. While the raw paint is recovered depending on the case but the complete recovery is difficult and, even in the case of recovery, at least a portion thereof has to be treated.

55 Further, Japanese Patent Laid-Open Sho 63-260970 discloses an invention of adding, for example, glutamic acid

to a booth circulating water. Further, Japanese Patent Laid-Open Sho 62-298478 describes an invention of adding, for example, a maleic acid series polymer but satisfactory effects can be obtained by none one of such methods.

#### Disclosure the Invention

5

A wet paint spray booth treating agent according to the present invention comprises a melamine-aldehyde acid colloid solution, at least one nitrogen atom-containing organic compound containing an amino group or an alkyl substituent thereof, which is selected from an amino acid, amino acid salts, amino acid derivatives, amines, ethylenediamine tetraacetic acid (EDTA), EDTA salts, nitrilotriacetic acid (NTA) and NTA salts, and an anionic water soluble high molecular weight dispersant.

10

A method for the treatment of a wet paint spray booth according to the present invention comprises adding a melamine-aldehyde acid colloid solution, at least one nitrogen atom-containing organic compound as defined above and an anionic water soluble high molecular weight dispersant to a recirculating washing water in a wet paint spray booth.

15

Since the hydrophobic property of paint particles such as of an acrylic type resin is much more strong as compared with that of the melamine - aldehyde acid colloid solution, the melamine - aldehyde acid colloid solution alone shows poor absorption property and reduction of tackiness is somewhat insufficient. In particular, in a case of a great paint load in which the surplus paint enters the system at a high velocity, the absorption rate of the melamine - aldehyde acid colloid solution to the paint can not catch up with the charging velocity of the surplus paint, which makes the reduction of tackiness insufficient.

20

In such a case, the anionic water soluble high molecular weight dispersant such as of maleic acid type polymers can compensate the absorption of the melamine - aldehyde acid colloid solution to the surplus paint. That is, since the anionic water soluble high molecular weight dispersant has hydrophobic groups, it can easily be adsorbed on the paint that has also the hydrophobic property. The hydrophobic groups of the high molecular weight dispersant are adsorbed on the surface of the paint particles, while the hydrophilic groups ( $-\text{COO}^-$ ) thereof are oriented outward of the particles, which increases the hydrophilic property of the paint particles to enhance the reduction of tackiness of the paint and improve the adsorption property of the melamine - aldehyde acid colloid solution to the paint particles. In this case, only with the layer which is made by the coverage of the high molecular weight dispersant, the degree of the reduction of tackiness is insufficient because this layer is weak and a layer of melamine aldehyde colloid solution is necessary.

25

By the way, since the hydrophilic property of the hydrophilic groups of the high molecular weight dispersant is extremely strong, molecules of water may be arranged at the periphery thereof, depending on the case, to hinder the melamine aldehyde acid colloid solution from approaching the paint particles. In this case, since the nitrogen - containing groups (such as  $\text{NH}_2$  groups) of the nitrogen atom-containing organic compound has a strong reactivity with the hydrophilic groups of the high molecular weight dispersant, they are adsorbed while excluding the molecules of water to facilitate the adsorption between the melamine aldehyde acid colloid solution and the paint particles (or the layer of the high molecular weight dispersant).

30

As described above in a system where the melamine - aldehyde colloid solution, the high molecular weight dispersant and the nitrogen atom-containing organic compound are present together, adsorption between the melamine - aldehyde acid colloid solution and the paint particles (or the layer of the high molecular weight dispersant at the surface thereof) is facilitated to make the reduction of tackiness of the paint more completely.

35

The high molecular weight dispersant also provides an effect of promoting the reduction of tackiness by preventing the paint particles from coagulating into a mass due to its dispersing power.

40

#### Brief Explanation of the Drawings

Fig. 1 is a schematic cross sectional view illustrating a test device used in an example.

#### Best Mode for Practicing the Invention

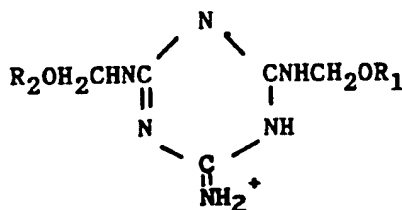
45

The present invention will now be described specifically hereinafter.

Melamine - aldehyde acid colloid solution according to the present invention can be produced, for example, by causing melamine to react with 1 to 6 mols of aldehyde based on one mol of melamine to obtain methylol melamine and further adding a monobasic acid to the thus obtained methylol melamine. Further, those prepared by further alkyl-etherifying methylol melamine with a lower alcohol and adding thereto a monobasic acid can also be used.

50

That is, methylol melamine or alkyl-etherified methylol melamine according to the present invention is represented by the following structural formula, and the acid colloid solution comprises the compound which about 1 - 10 units thereof condensed together.



where  $R_1$  and  $R_2$  may be identical or different with each other and represent respectively hydrogen or lower alkyl group with 1 to 4 carbon atoms.

As the aldehyde, there can be mentioned, for example, formaldehyde, paraformaldehyde, acetaldehyde and propionaldehyde, among them, formaldehyde and paraformaldehyde being particularly preferred from the view point of handling and efficiency of reaction.

The ratio of melamine and aldehyde to be charged is from 1 to 6 mol of aldehyde per 1 mol of melamine. When aldehyde exceeds 2.5 mol, the amount of free aldehyde is increased in the produced acid colloid solution. Since the free aldehyde forms a source for COD, the amount of aldehyde is preferably less than 2.5 mols where COD causes a problem.

The methylol melamine obtained as described above does not dissolve in water but dissolves in a colloidal state in an acid solution. On the other hand, the alkyl-etherified methylol melamine which is obtained by further alkyl-etherifying methylol melamine is water soluble and causes etheric decomposition to form methylol melamine also into a colloidal state upon addition of the acid.

As the acid to be used, monobasic acid can be mentioned. As the monobasic acid, there can be mentioned mineral acids such as hydrochloric acid and nitric acid, as well as organic acids such as formic acid, acetic acid, lactic acid and propionic acid. Among them, hydrochloric acid is preferred since it can form a stable colloid solution.

The amount of the monobasic acid, particularly, hydrochloric acid to be added is advantageously about from 0.5 to 1.5 mols, preferably, from 0.7 to 1.3 mols based on one mol of melamine.

If the amount of the acid added is less than 0.5 mol, it becomes difficult to provide a sufficient acid colloidal solution. On the other hand, if it exceeds 1.5 mols, the stability of the colloid solution tends to be worsened.

During the initial stage of preparing the methylol melamine acid colloid solution, the colloid solution contains free aldehyde in a large amount, but the free aldehyde is decreased when the solution is left standing and aging at a room temperature after preparation. The aging can be accelerated also by heating. The time for the aging is, appropriately, from 5 days to three months in a case of aging at a room temperature and about from 2 to 3 hours in a case of aging under heating at 50°C.

The nitrogen atom-containing organic compound, containing amino group or an alkyl substituent thereof is selected from the following I - III:

I : amino acid such as glycine, glutamic acid and aspartic acid or the salts thereof, amino acid derivatives such as betain or gelatin,

II : amines such as dimethylaminoethanol, monoethanol amine, diethanolamine, triethanolamine and aminomethyl propanol,

III : ethylenediaminetetraacetic acid (EDTA), nitrilotriacetic acid (NTA) and salts thereof.

As the anionic water soluble molecular weight dispersant, those having a molecular weight ranging from 300 to 500,000 and, in particular, from 500 to 500,000 are preferred, which may be either water soluble type or emulsion type and, more specifically, the compounds referred to as (a) and (b) below can be mentioned:

(a) homopolymer, copolymer, terpolymer containing carboxylic acid monomers such as acrylic acid, methacrylic acid and maleic acid, or salts of such polymers.

(b) homopolymer, copolymer, terpolymer containing partially hydrolyzed acrylamide monomer, or salts of such polymers.

The reason why relatively low molecular weight water soluble high molecular weight polymer having a molecular weight of greater than 300 and smaller than 500,000 are preferred as the anionic water soluble high molecular weight dispersant is that the effect of reducing the tackiness of a paint can be provided by the water soluble high molecular weight polymer having the molecular weight of greater than 300, whereas such effect for the reduction of tackiness can not be obtained sufficiently with a water soluble high molecular weight polymer having the molecular weight of less

than 300. On the other hand, the water soluble high molecular weight polymer having the molecular weight in excess of 500,000 increases the effect of coagulating the paint particles and increases the tackiness of the high molecular polymer per se and, accordingly, they are not appropriate.

For the maleic acid type polymers, those having the molecular weight in excess of 500 and less than 1000 are particularly preferred.

The wet paint spray booth treating agent of the present invention is desired to contain the above-mentioned three ingredients at a ratio, as the pure component, of:

Melamine - aldehyde acid colloid solution = 40 to 99.8 wt%

Nitrogen atom-containing organic compound = 0.1 to 30 wt%.

Anionic water soluble high molecular weight dispersant = 0.1 to 30 wt%.

The wet paint spray booth treating agent of the present invention may also incorporate other chemicals in addition to the above-mentioned three ingredients. Further, it may be used in combination with other chemicals. Preferred chemicals and their functions and effects are as follows.

(i) Alkali agent: effective in forming a solution of the amino acid, carboxylic acid or the like and in pH adjustment and corrosion protection for the facility.

(ii) High molecular weight flocculant, inorganic flocculant: effective in coagulation of sludges and solid-liquid separation.

(iii) Tackiness-reducing agent such as amphoteric metal, surface active agent: effective in further improvement of the reduction of tackiness of the paint.

The method for the treatment of a wet paint spray booth according to the present invention resides in applying a treatment by using the wet paint spray booth treating agent of the present invention as described above, which comprises injecting and adding an appropriate amount of the treating agent of the present invention into the recirculating washing water of the wet paint spray booth, thereby obliterating tackiness of the surplus paint collected in the water or raw paint.

In this case, the addition amount of the wet paint spray booth treating agent according to the present invention is properly determined such that the amount of the melamine - aldehyde acid colloid solution, the effective ingredient of which is assumed as 10% by weight, is greater than 0.1 ppm and, usually, about 1 to 1000 ppm based on the washing water and greater than 0.1% by weight, and usually, about 1 to 100% by weight based on the amount of the surplus paint in the washing water, such that the amount of the nitrogen atom-containing organic compound is greater than 0.001 ppm and, usually, about from 0.01 to 20 ppm based on the washing water and greater than 0.001% by weight and, preferably, from 0.01 to 5% by weight based on the amount of the surplus paint in the washing water and further such that the amount of the anionic water soluble high molecular weight dispersant is greater than 0.001 ppm and, usually, about from 0.01 to 20 ppm based on the washing water and greater than 0.001 % by weight and, usually, about from 0.01 to 5% by weight based on the amount of the surplus paint.

There is no particular restriction on the injection method, and each of the three ingredients may be injected continuously or intermittently into the recirculating washing water each at same or different injection positions. Further, each of the ingredients may be either in a powdery or liquid form and in either of one liquid in which two components are dissolved or two or more individual liquids. That is, in the wet paint spray booth treating agent according to the present invention, the nitrogen atom-containing organic compound and the anionic water soluble high molecular dispersant usually have compatibility but the melamine-aldehyde acid colloid solution is not soluble to them.

Accordingly, only the melamine - aldehyde acid colloid solution may be injected individually.

Further, in the present invention, each of the melamine - aldehyde acid colloid solution, the nitrogen atom-containing organic compound and the anionic water soluble high molecular weight dispersant may be used alone or as a combination of two or more of species.

The present invention will now be described more specifically referring to examples and comparative examples but the present invention is not restricted to the following examples unless it does not exceed the gist thereof.

## Examples 1 - 18, Comparative Examples 1 - 21

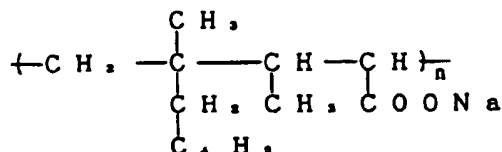
Using the test device shown in Fig. 1, effects for each kinds of chemicals were tested.

In Fig. 1, 1 is a pit, 2 is a water film plate, 3 is a circulating water pipe line having a circulating water pump P, 4 is an exhaust cylinder having an exhaust blower 4A and W is a water level. 5 is a spray gun disposed above the water film plate 2 for blowing the paint. 6 is a chemical adding section.

A test was conducted by using a testing device having a washing water capacity of 50 liter and at an amount of circulating water of 50 liter/min. As the washing water, those incorporated with chemicals shown in Table 1 by the addition amounts shown in Table 1 (based on the paint) and adjusted to pH to 7 - 10 were used (chemicals not added in Comparative Example 1). In Table 1, the high molecular weight dispersant polymers A - F used are as follows.

High molecular weight dispersant

- Polymer A: Maleic acid polymer  
average molecular weight = 1000
- Polymer B: Maleic acid - isopentene copolymer  
average molecular weight = 4000
- Polymer C: Isobutylene - maleic acid copolymer  
average molecular weight = 9000
- Polymer D:



- average molecular weight = 9000
- Polymer E: Hydroxyethyl acrylate - methacrylic acid - methyl acrylate copolymer  
average molecular weight = 3000
- Polymer F: Sodium polyacrylate  
average molecular weight = 6000

Further, as the melamine - aldehyde acid colloid solutions, the followings were used.

Melamine - Aldehyde Acid Colloid Solution

Prepared by adding 0.05 mol of methylol melamine obtained by reacting 2 mol of formaldehyde to 1 mol of melamine, to 100 ml of an aqueous 1.35% hydrochloric acid solution. It is hereinafter abbreviated as "MF".

A test was conducted by blowing 50 cc of a white acrylic type resin paint ("#65-1205", manufactured by Rock Paint Co.) at a velocity shown in Table 1 from a spray gun 5 and, subsequently, by observing the blown paint and washing water (circulating water) or the appearance of pit, pipeline or the like. Based on the results of the observation, tackiness was evaluated depending on the amount of the paint deposited to the inner wall of the pit or the pipe line, in accordance with the following standards. The results are shown in Table 1.

Evaluation Standards

- x --- Identical with the state of deposition in a case without treatment (blank)
- Δ --- deposition amount slightly reduced than in a case without treatment (blank)
- o --- deposited scarcely
- ⊙ --- not deposited at all

## Examples 19 - 21, Comparative Examples 22 - 25

In the testing device shown in Fig. 1, the same 20 cc of the paint as used in Example 1 was dropped over the water film plate 2 for about 5 sec. Subsequently, washing water incorporated with the chemicals shown in Table 2 at the addition amounts (based on the paint) shown in Table 2 was kept to be circulated for 30 sec. Thereafter, circulation was interrupted and the tackiness and the appearance were examined in the same manner as in Example 1.

The results are shown in Table-2.

Table 1 (No. 1)

5

10

15

20

25

30

35

40

45

50

55

Example	Blowing velocity (cc/min)	Chemicals	Addition amount (wt%)	Tackiness	appearance
Example	1	M/F	20	○~△	Particle floated
		Polymer A	0.2		
		Sodium glutamate	0.02		
	2	M/F	20	○	Particle floated
		Polymer A	0.2		
		Sodium glutamate	0.1		
	3	M/F	20	◎~○	Particle floated
		Polymer A	0.2		
		Sodium glutamate	0.2		
	4	M/F	20	◎~○	Particle floated
		Polymer A	0.2		
		Sodium glutamate	1		
	5	M/F	20	○~△	Particle floated
		Polymer A	0.01		
		Sodium glutamate	0.2		
	6	M/F	20	○	Particle floated
		Polymer A	0.1		
		Sodium glutamate	0.2		



Table 1 (No. 2)

Example	Blowing velocity (cc/min)	Chemicals	Addition amount (wt%)	Tachikiness	Appearance
Example	7	M/F	20	◎~○	Fine particles floated
		Polymer A	1		
		Sodium glutamate	0.2		
	8	M/F	20	○	Fine particles floated
		Polymer B	0.2		
		Sodium glutamate	0.2		
	9	M/F	20	○	Fine particles floated
		Polymer C	0.2		
		Sodium glutamate	0.2		
	10	M/F	20	○	Fine particles floated
		Polymer D	0.2		
		Sodium glutamate	0.2		
	11	M/F	20	○	Particles floated
		Polymer E	0.2		
		sodium glutamate	0.2		
	12	M/F	20	○	Particles floated
		Polymer F	0.2		
		Sodium glutamate	0.2		

Table 1 (No. 3)

Example	Blowing velocity (cc/min)	Chemicals	Addition amount (wt%)	Tackiness	Appearance
Example	13	30	M/F	◎~○	Fine particles floated
			Polymer A		
			DL-serine		
	14	30	M/F	◎	Fine particles floated
			Polymer A		
			Sodium aspartate		
	15	30	M/F	◎~○	Fine particles floated
			Polymer A		
			Betain		
	16	30	M/F	◎~○	Fine particles floated
			Polymer A		
			Triethanolamine		
	17	30	M/F	◎~○	Fine particles floated
			Polymer A		
			Diethanolamine		
	18	30	M/F	◎~○	Fine particles floated
			Polymer A		
			EDTA		

Table 1 (No. 4)

Example	Blowing velocity (cc/min)	Chemicals	Addition amount (wt%)	Tackiness	Appearance
1	5	Blank	0	×	Deposited to inner wall
2	5	M/F	20	⊙	Fine particles floated
3	10	M/F	20	○	particles floated
4	20	M/F	20	△	Mass floated
5	30	M/F	20	×	Mass floated, partially deposited to inner wall
6	10	M/F	20	⊙	Fine particles floated
		Polymer A	0.2		
7	20	M/F	20	○~△	Particles floated, partially mass floated
		Polymer A	0.2		
8	30	M/F	20	△	Particles floated but coagulated with time
		Polymer A	0.2		
9	10	M/F	20	○	Particles and mass floated
		Sodium glutamate	0.2		
10	20	M/F	20	○~△	Mass floated
		Sodium glutamate	0.2		

Table 1 (No. 5)

Example	Blowing velocity (cc/min)	Chemicals	Addition amount (wt%)	Tackiness	Appearance
Comparative Example	11	M/F	20	$\Delta \sim \times$	Mass floated
		sodium glutamate	0.2		
	12	Sodium glutamate	0.2	$\times$	Mass floated
	13	Sodium glutamate	1.0	$\times$	Mass floated
	14	Diethanolamine	0.2	$\times$	Mass floated
	15	Diethanolamine	1.0	$\times$	Mass floated
	16	Polymer A	0.2	$\times$	Mass floated
	17	Polymer A	1.0	$\Delta$	Mass floated
	18	Sodium glutamate	0.2	$\Delta$	Mass floated
		Polymer A	0.2		
	19	Sodium Glutamate	1.0	$\Delta$	Mass floated
		Polymer A	1.0		
	20	Diethanolamine	0.2	$\Delta$	Mass floated
		Polymer A	0.2		
	21	Diethanolamine	1.0	$\Delta$	Mass floated
		Polymer A	1.0		

Table 2

Example	Chemicals	Addition amount (wt%)	Tackiness	Appearance
Example	19	M/F	$\Delta$	Particles and mass floated
		Polymer A		
		Sodium glutamate		
	20	M/F	$\bigcirc \sim \Delta$	Particles floated
		Polymer A		
		Sodium glutamate		
	21	M/F	$\bigcirc$	Particles floated
		Polymer A		
		Sodium glutamate		
Comparative example	22	M/F	$\times$	Particles and mass floated
	23	M/F	$\times$	Particles floated but coagulated with time
		Polymer A		
	24	M/F	$\times$	Particles floated
		Sodium glutamate		
	25	Polymer A	$\times$	Particles floated
		Sodium glutamate		

As apparent from the foregoing results, the wet paint spray booth treating agent according to the present invention can remarkably diminish the deposition, adhering and coagulation of the paint in the system of the wet booth even in a case where the amount of the surplus paint is great. Furthermore, the treating agent according to the present invention is extremely effective also to the raw paint.

#### Industrial Applicability

By the wet paint spray booth treating agent and the method for the treatment of the wet paint spray booth according to the present invention, it is possible to effectively reduce the tackiness of the surplus paint, and make the paint easily

removable in the flowable particle state. Furthermore, it is effective substantially to all kinds of paints, and has a high effect of reducing tackiness also to the acrylic or phthalic acid type paints, as well as to high-solid type paints which are considered difficult to reduce their tackiness. In addition, even when a load is great or a raw paint is discharged, the agent according to the present invention can also reduce the tackiness. By the way, by the treating agent and the treating method according to the present invention, treatment is possible up to about 600 ppm of the blowing amount of the paint based on the amount of the recirculating washing water.

Therefore, by the treating agent and the treating method according to the present invention,

- (1) clogging in the nozzle due to the deposition of the paint to the piping system or the like can be prevented to maintain the water washing efficiency at a satisfactory level and moderate the maintenance.
- (2) Deterioration of the working environment by the clogging in the gas discharge system or the like can be prevented.
- (3) The paint sludge which deposits or floats in the booth pit or the like is not easily solidified and can be removed readily.

Accordingly, the removing operation can be moderated.

- (4) Cleaning liquid waste can easily be put to solid-liquid separation and the waste water can be treated easily.
- (5) Solids in washing water after use can be separated and removed at a high separating efficiency to maintain the clarity of the circulating washing water at high level.

Then, treatment for the paint booth can be conducted with an extreme industrial advantage.

#### Claims

1. A wet paint spray booth treating agent comprising a melamine-aldehyde acid colloid solution, at least one nitrogen atom-containing organic compound containing an amino group or an alkyl substituent thereof, which is selected from an amino acid, amino acid salts, amino acid derivatives, amines, ethylenediamine tetraacetic acid (EDTA), EDTA salts, nitriotriacetic acid (NTA) and NTA salts, and an anionic water soluble high molecular weight dispersant.
2. The treating agent as defined in claim 1, wherein the nitrogen atom-containing organic compound is glycine, glutamic acid or a salt thereof, aspartic acid or a salt thereof, betain, gelatin.
3. The treating agent as defined in claim 1, wherein the nitrogen atom-containing organic compound is dimethylaminoethanol, monoethanol amine, diethanolamine, triethanolamine or amino methyl propanol.
4. The treating agent as defined in claim 1, wherein the molecular weight of the anionic water soluble high molecular dispersant is from 300 to 500,000.
5. The treating agent as defined in claim 4, wherein the anionic water soluble high molecular weight dispersant is a homopolymer, copolymer, terpolymer containing carboxylic acid monomers, or a salt of said polymer.
6. The treating agent as defined in claim 4, wherein the anionic water soluble high molecular weight dispersant is a homopolymer, copolymer, terpolymer containing acrylamide monomer partially hydrolyzates or a salt of said polymer.
7. The treating agent as defined in claim 5, wherein the polymer containing the carboxylic acid monomer is a maleic acid type polymer with a molecular weight greater than 500 and smaller than 1,000.
8. The treating agent as defined in claim 1, wherein the melamine - aldehyde acid colloid solution comprises methylol melamine in which 1 to 6 mols of aldehyde is bonded to 1 mol of melamine, and an acid.
9. The treating agent as defined in claim 8, wherein the melamine - aldehyde acid colloid solution comprises an alkyl-etherified methylol melamine prepared by further alkyl - etherifying methylol melamine in which melamine and aldehyde are bonded, and an acid.
10. The treating agent as defined in claim 8, wherein the acid is hydrochloric acid.

11. A treating agent as defined in claim 10, wherein the hydrochloric acid is added by from 0.5 to 1.5 mols based on 1 mol of melamine.
12. A treating agent as defined in claim 8, wherein the aldehyde is formaldehyde or paraformaldehyde.
13. A treating agent is defined in claim 1, the treating agent comprises 40 to 99.8% by weight of the melamine - aldehyde acid colloid solution, 0.1 to 30% by weight of the nitrogen atom-containing organic compound and 0.1 to 30% by weight of the anionic water soluble high molecular weight dispersant.
14. A method for the treatment of a wet paint spray booth which comprises adding a melamine - aldehyde acid colloid solution, at least one nitrogen atom - containing organic compound as defined in claim 1 and an anionic water soluble high molecular weight dispersant to a recirculating washing water of a wet paint spray booth.
15. The method as defined in claim 14, wherein the addition amount of the melamine - aldehyde acid colloid solution to the recirculating washing water is from 1 to 1000 ppm.
16. The method as defined in claim 14, wherein the addition amount of the nitrogen atom-containing organic compound to the cleaning water is from 0.01 to 20 ppm.
17. The method as defined in claim 14, wherein the addition amount of the anionic water soluble high molecular weight dispersant to the cleaning water is from 0.01 to 20 ppm.
18. The method as defined in claim 14, wherein the addition amount of the melamine - aldehyde acid colloid solution based on the amount of the surplus paint in the recirculating washing water is from 1 to 100% by weight.
19. The method as defined in claim 14, wherein the addition amount of the nitrogen atom-containing organic compound based on the amount of the surplus paint in the cleaning water is from 0.01 to 5% by weight.
20. The method as defined in claim 14, wherein the addition amount of the anionic water soluble high molecular weight dispersant based on the amount of the surplus paint in the cleaning water is from 0.01 to 5% by weight.

#### Patentansprüche

1. Mittel zur Behandlung von Spritzkabinen für nasse Farben, umfassend eine Melamin-Aldehydsäurekolloidlösung, mindestens eine stickstoffatomhaltige organische Verbindung, die eine Aminogruppe oder einen Alkyl-Substituenten davon enthält, welche aus einer Aminosäure, Aminosäuresalzen, Aminosäurederivaten, Aminen, Ethylen-diamintetraessigsäure (EDTA), EDTA-Salzen, Nitriotriessigsäure (NTA) und NTA-Salzen ausgewählt wird, und ein anionisches in Wasser lösliches Dispergiemittel mit einem hohen Molekulargewicht.
2. Behandlungsmittel nach Anspruch 1, worin die stickstoffatomhaltige organische Verbindung Glycin, Glutaminsäure oder ein Salz davon, Asparaginsäure oder ein Salz davon, Betain oder Gelatine ist.
3. Behandlungsmittel nach Anspruch 1, worin die stickstoffatomhaltige organische Verbindung Dimethylaminoethanol, Monoethanolamin, Diethanolamin, Triethanolamin oder Aminomethylpropanol ist.
4. Behandlungsmittel nach Anspruch 1, worin das Molekulargewicht des anionischen in Wasser löslichen Dispergiemittels mit einem hohen Molekulargewicht von 300 bis 500.000 beträgt.
5. Behandlungsmittel nach Anspruch 4, worin das anionische in Wasser lösliche Dispergiemittel mit einem hohen Molekulargewicht ein Homopolymer, Copolymer, Terpolymer, das Carbonsäuremonomere enthält, oder ein Salz des Polymers ist.
6. Behandlungsmittel nach Anspruch 4, worin das anionische in Wasser lösliche Dispergiemittel mit einem hohen Molekulargewicht ein Homopolymer, Copolymer, Terpolymer, das Teilhydrolysate von Acrylamidmonomeren enthält, oder ein Salz des Polymers ist.
7. Behandlungsmittel nach Anspruch 5, worin das das Carbonsäuremonomer enthaltende Polymer ein Polymer vom

Maleinsäure-Typ mit einem Molekulargewicht von mehr als 500 und weniger als 1000 ist.

8. Behandlungsmittel nach Anspruch 1, worin die Melamin-Aldehydsäurekolloidlösung Methylolmelamin, worin 1 bis 6 Mol des Aldehyds an 1 Mol Melamin gebunden ist, und eine Säure umfaßt.
9. Behandlungsmittel nach Anspruch 8, worin die Melamin-Aldehydsäurekolloidlösung ein Alkyl-veretheretes Methylolmelamin, das durch eine weitere Alkyl-Veretherung von Methylolmelamin hergestellt wurde, wobei Melamin und Aldehyd gebunden werden, und eine Säure umfaßt.
10. Behandlungsmittel nach Anspruch 8, worin die Säure Salzsäure ist.
11. Behandlungsmittel nach Anspruch 10, worin die Salzsäure, bezogen auf 1 Mol Melamin, in einer Menge von 0,5 bis 1,5 Mol zugegeben wird.
12. Behandlungsmittel nach Anspruch 8, worin das Aldehyd Formaldehyd oder para-Formaldehyd ist.
13. Behandlungsmittel nach Anspruch 1, worin das Behandlungsmittel 40 bis 99,8 Gew.-% der Melamin-Aldehydsäurekolloidlösung, 0,1 bis 30 Gew.-% der stickstoffatomhaltigen organischen Verbindung und 0,1 bis 30 Gew.-% des anionischen in Wasser löslichen Dispergiemittels mit einem hohen Molekulargewicht enthält.
14. Verfahren zur Behandlung einer Spritzkabine für nasse Farben, das das Zugabe einer Melamin-Aldehydsäurekolloidlösung, mindestens einer stickstoffatomhaltigen organischen Verbindung nach Anspruch 1 und eines anionischen in Wasser löslichen Dispergiemittels mit einem hohen Molekulargewicht zu einem im Kreislauf geführten Waschwasser einer Spritzkabine für nasse Farbe umfaßt.
15. Verfahren nach Anspruch 14, worin die Zugabemenge der Melamin-Aldehydsäurekolloidlösung zu dem im Kreislauf geführten Waschwasser von 1 bis 1000 ppm beträgt.
16. Verfahren nach Anspruch 14, worin die Zugabemenge der stickstoffatomhaltigen organischen Verbindung zu dem Reinigungswasser von 0,01 bis 20 ppm beträgt.
17. Verfahren nach Anspruch 14, worin die Zugabemenge des anionischen in Wasser löslichen Dispergiemittels mit einem hohen Molekulargewicht zu dem Reinigungswasser von 0,01 bis 20 ppm beträgt.
18. Verfahren nach Anspruch 14, worin die Zugabemenge der Melamin-Aldehydsäurekolloidlösung, bezogen auf die Menge der überschüssigen Farbe in dem im Kreislauf geführten Wasser, von 1 bis 100 Gew.-% beträgt.
19. Verfahren nach Anspruch 14, worin die Zugabemenge der stickstoffatomhaltigen organischen Verbindung, bezogen auf die Menge der überschüssigen Farbe in dem Reinigungswasser, von 0,01 bis 5 Gew.-% beträgt.
20. Verfahren nach Anspruch 14, worin die Zugabemenge des anionischen in Wasser löslichen Dispergiemittels mit einem hohen Molekulargewicht, bezogen auf die Menge der überschüssigen Farbe in dem Reinigungswasser, von 0,01 bis 5 Gew.-% beträgt.

#### Revendications

1. Agent de traitement de cabine de peinture au pistolet par voie humide comprenant une solution colloïdale acide mélamine-aldéhyde, au moins un composé organique contenant un atome d'azote, contenant un groupe amino ou un substituant alkyle de ce groupe, qui est choisi parmi un acide aminé, les sels d'acide aminé, les dérivés d'acide aminé, les amines, l'acide éthylènediaminetétraacétique (EDTA), les sels d'EDTA, l'acide nitrilotriacétique (NTA), et les sels de NTA, ainsi qu'un dispersant anionique, soluble dans l'eau, de haut poids moléculaire.
2. Agent de traitement selon la revendication 1, dans lequel le composé organique contenant un atome d'azote est la glycine, l'acide glutamique ou un sel de cet acide, l'acide aspartique ou un sel de celui-ci, la bêtaïne, la gélatine.
3. Agent de traitement selon la revendication 1, dans lequel le composé organique contenant un atome d'azote est le diméthylaminoéthanol, la monoéthanolamine, la diéthanolamine, la triéthanolamine ou l'aminométhylpropanol.



4. Agent de traitement selon la revendication 1, dans lequel le poids moléculaire du dispersant anionique, soluble dans l'eau, de haut poids moléculaire, est de 300 à 500 000.
5. Agent de traitement selon la revendication 4, dans lequel le dispersant anionique, soluble dans l'eau, de haut poids moléculaire, est un homopolymère, un copolymère, un terpolymère, contenant des monomères acides carboxyliques, ou un sel dudit polymère.
6. Agent de traitement selon la revendication 4, dans lequel le dispersant anionique, soluble dans l'eau, de haut poids moléculaire, est un homopolymère, un copolymère, un terpolymère, contenant le monomère acrylamide partiellement hydrolysé, ou un sel dudit polymère.
7. Agent de traitement selon la revendication 5, dans lequel le polymère contenant le monomère acide carboxylique est un polymère de type acide maléique avec un poids moléculaire supérieur à 500 et inférieur à 1 000.
8. Agent de traitement selon la revendication 1, dans lequel la solution colloïdale acide mélamine-aldéhyde comprend de la méthylolmélamine, dans laquelle 1 à 6 moles d'aldéhyde est(sont) liée(s) à 1 mole de mélamine, et un acide.
9. Agent de traitement selon la revendication 8, dans lequel la solution colloïdale acide mélamine-aldéhyde contient une méthylolmélamine alkyléthérifiée, préparée en effectuant en outre une alkyléthérification de la méthylolmélamine dans laquelle la mélamine et l'aldéhyde sont liées, et un acide.
10. Agent de traitement selon la revendication 8, dans lequel l'acide est l'acide chlorhydrique.
11. Agent de traitement selon la revendication 10, dans lequel on ajoute de 0,5 à 1,5 moles d'acide chlorhydrique, sur la base d'une mole de mélamine.
12. Agent de traitement selon la revendication 8, dans lequel l'aldéhyde est le formaldéhyde ou le paraformaldéhyde.
13. Agent de traitement selon la revendication 1, qui comprend de 40 à 99,8 % en poids de la solution colloïdale acide mélamine-aldéhyde, de 0,1 à 30 % en poids du composé organique contenant un atome d'azote, et de 0,1 à 30 % en poids du dispersant anionique, soluble dans l'eau, de haut poids moléculaire.
14. Procédé pour traiter des cabines de peinture au pistolet par voie humide, qui comprend l'addition d'une solution colloïdale acide mélamine-aldéhyde, d'au moins un composé organique contenant un atome d'azote tel que défini dans la revendication 1 et d'un dispersant anionique, soluble dans l'eau, de haut poids moléculaire, à une eau de lavage en recyclage d'une cabine de peinture au pistolet par voie humide.
15. Procédé selon la revendication 14, dans lequel la quantité ajoutée de la solution colloïdale acide mélamine-aldéhyde à l'eau de lavage en recyclage est de 1 à 1 000 ppm.
16. Procédé selon la revendication 14, dans lequel la quantité ajoutée du composé organique contenant un atome d'azote, à l'eau de lavage est de 0,01 à 20 ppm.
17. Procédé selon la revendication 14, dans lequel la quantité ajoutée du dispersant anionique, soluble dans l'eau, de haut poids moléculaire, à l'eau de lavage, est de 0,01 à 20 ppm.
18. Procédé selon la revendication 14, dans lequel la quantité ajoutée de la solution colloïdale acide mélamine-aldéhyde, sur la base de la quantité de peinture en surplus dans l'eau de lavage recirculante, est de 1 à 100 % en poids.
19. Procédé selon la revendication 14, dans lequel la quantité ajoutée du composé organique contenant un atome d'azote, sur la base de la quantité de peinture en surplus dans l'eau de lavage, est de 0,01 à 5 % en poids.
20. Procédé selon la revendication 14, dans lequel la quantité ajoutée du dispersant anionique, soluble dans l'eau, de haut poids moléculaire, sur la base de la quantité de peinture en surplus dans l'eau de lavage, est de 0,01 à 5 % en poids.

FIG.1

